IN THE UNITED STATES DISTRICT COURT WESTERN DISTRICT OF TEXAS AUSTIN DIVISION

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MONKEYMEDIA, INC.,	
Plaintiff,	
v. AMAZON.COM, INC.,	Case No. 1:20-cv-00010-LY
Defendant.	

DECLARATION OF DR. DAN SCHONFELD

- I, Dan Schonfeld, Ph.D., declare and state as follows:
- 1. I have been retained by Defendant Amazon.com, Inc. ("Amazon") to provide my opinions as to the meaning of certain claim terms recited in the claims of U.S. Patent Nos. 6,393,158 ("the '158 patent"), 9,185,379 ("the '379 patent"), 9,247,226 ("the '226 patent"), and 10,051,298 ("the '298 patent") (collectively, the "Asserted Patents") that have been asserted in this case by Plaintiff MonkeyMedia, Inc. ("MonkeyMedia").
- 2. I am being compensated for my time at my standard consulting rate of \$600 per hour, plus all reasonable expenses. My compensation is not dependent in any way upon the outcome of this proceeding.

I. PERSON AND PROFESSIONAL BACKGROUND

- 3. I am currently a Professor in the Department of Electrical and Computer Engineering at the University of Illinois at Chicago.
- 4. My qualifications for forming the opinions set forth in this Declaration are summarized here and include my educational background, career history, publications, and other relevant qualifications. My full *curriculum vitae* is attached as **Exhibit A** to this Declaration, and includes my detailed employment background, professional experience, and list of publications.
- 5. I received my B.S. degree in Electrical Engineering and Computer Science from the University of California, Berkeley, California, in 1986 with a concentration on Computer Engineering / Systems Engineering. I received my M.S. degree in Electrical and Computer Engineering from The Johns Hopkins University, Baltimore, Maryland, in 1988 with a concentration on Speech Processing / Biomedical Signal Processing. I received my Ph.D. degree in Electrical and Computer Engineering from The Johns Hopkins University, Baltimore, Maryland, in 1990 with a concentration on Nonlinear Signal Processing / Image Analysis.

- 6. In August 1990, I joined the Department of Electrical Engineering and Computer Science at the University of Illinois, Chicago, Illinois, where I am a tenured Professor in the Departments of Electrical and Computer Engineering, Computer Science, and Bioengineering. Before I joined the University of Illinois at Chicago, I served as an instructor in the Department of Electrical and Computer Engineering at The Johns Hopkins University, Baltimore, Maryland.
- 7. At the University of Illinois at Chicago, I have served as the Director of the University-Industry Engineering Research Center (UIERC), formerly the Manufacturing Research Center (MRC). I am also Co-Director of the Multimedia Communications Laboratory (MCL) and a member of the Signal and Image Research Laboratory (SIRL).
- 8. Over the past few decades, I have also served as a visiting professor in (a) the Advanced Analytics Institute (AAI) at the University of Technology, Sydney, Australia, (b) the Department of Information Engineering and Computer Science ("DISI") at the University of Trento, Italy, (c) the School of Computer Engineering at the Nanyang Technological University, Singapore, and (d) the Department of Electrical Engineering—Systems at Tel-Aviv University, Israel.
- 9. I have been elected Fellow of the Institute of Electrical and Electronics Engineers ("IEEE") "for contributions to image and video analysis" as well as Fellow of the International Society for Optics and Photonics ("SPIE") "for specific achievements in morphological image processing and video analysis." I have also been elected University Scholar of the University of Illinois. A complete list of my publications, professional activities, and honors that I have received is fully set forth in my *curriculum vitae*, attached hereto as **Exhibit A**.

- 10. I have previously served as Editor-in-Chief and Deputy Editor-in-Chief of the IEEE Transactions on Circuits and Systems for Video Technology. I have also previously served as Area Editor for special issues of the IEEE Signal Processing Magazine. I have served as Associate Editor of the IEEE Transactions on Image Processing (on image and video storage, retrieval and analysis), Associate Editor of the IEEE Transactions on Circuits and Systems for Video Technology (on video analysis), Associate Editor of the IEEE Transactions on Signal Processing (on multidimensional signal processing and multimedia signal processing), and Associate Editor of the IEEE Transactions on Image Processing (on nonlinear filtering). I have also served on the editorial board of the IEEE Signal Processing Magazine, EURASIP Journal of Image and Video Processing, Research Letters in Signal Processing, and Bentham Science Publishers, Ltd.'s "Recent Patents on Computer Science" and "Recent Patents on Electrical Engineering" publications. I have served as guest editor of numerous special issues in various journal publications in the area of multimedia systems.
- I currently serve on the Conference Board of the IEEE Signal Processing Society. I have previously served as Technical Program Chair of the IEEE International Conference on Acoustics, Speech, and Signal Processing ("ICASSP") 2018 as well as Program Chair of the IEEE Conference on Visual Communications and Image Processing ("VCIP") 2015. I have also previously served as General Co-Chair of the Workshop on Big Data in 3D Computer Vision 2013 and the IEEE International Conference on Multimedia and Expo ("ICME") 2012. I have served as Chair of the IEEE Workshop on Video Mining 2008 and the SPIE Conference on Visual Communications and Image Processing 2007. I have also served on the organizing committees of various conferences including the IEEE International Conference on Image Processing 1998, 2012, and 2020, IEEE/SPIE International Conference on Visual

Communications and Image Processing (VCIP) 2010, 2017, and IEEE Workshop on Nonlinear Signal and Image Processing (NSIP) 1997. I was an organizer of the Thematic Symposium on Multimedia Search and Retrieval at the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2009.

- 12. I have authored and co-authored over 250 technical papers for various journals and conferences. I was author of a book chapter, entitled: "Image and video communication networks," and later editions entitled: "Video communication networks." I was co-author (with Carlo Giulietti and Rashid Ansari) of a paper that won the Best Paper Award at the ACM Multimedia Workshop on Advanced Video Streaming Techniques for Peer-to-Peer Networks and Social Networking 2010. I was also co-author (with Junlan Yang) of a paper that won the Best Student Paper Award at the IEEE International Conference on Image Processing 2007. I was also co-author (with Wei Qu) of a paper that won the Best Student Paper Award at the IEEE International Conference on Image Processing 2006. I was also co-author (with Nidhal Bouaynaya) of a paper that won the Best Student Paper Award in Visual Communications and Image Processing 2006. In addition, many of my publications relate to the broad topic of multimedia systems, which includes audio, image, and video processing. My publications in the area of multimedia systems dates back to 1988. A list of my publications within the past ten years is included in Exhibit A.
- 13. I was the keynote speaker at the International Conference on Wireless
 Communications and Signal Processing (WCSP), Yangzhou, China, in 2016, and the
 International Conference on Intelligent Control and Information Processing (ICICIP) and
 International Conference on Brain Inspired Cognitive Systems (BICS), Beijing, China, in 2013.
 Further, I was a plenary speaker at the IEEE/IET International Conference on Audio, Language

and Image Processing (ICALIP), Shanghai, China, in 2010, and at the IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS), Genoa, Italy, in 2009. I was also a plenary speaker at the INPT/ASME International Conference on Communications, Signals, and Systems (ICCSS), Rabat Morocco, in 1995 and 2001.

- 14. I have served as Representative of Regions 1-6 (North America) on the Chapters Committee of the IEEE Signal Processing Society. I have also served as Chairman of the IEEE Signal Processing Chicago Chapter. I have also served on the IEEE Image, Video, and Multidimensional Signal Processing (IVMSP) Technical Committee, formerly the IEEE Image and Multidimensional Signal Processing (IMDSP) Technical Committee, Visual Signal Processing and Communications (VSPC) Technical Committee, IEEE Signal and Image Processing in Medicine Technical Committee, and the IEEE Multimedia Communications

 Technical Committee. I currently serve on the American National Standards Institute (ANSI) / Underwriters Laboratory (UL) Standards Technical Panel ("STP") on Multimedia Systems.
- 15. I have also taught various courses that relate to multimedia systems. For example, since the late 1990s, I have introduced and taught an advanced undergraduate-level / first-year graduate-level course on multimedia systems (originally called multimedia communication networks), which focuses on audio, image, and video processing and communications.
- 16. I have also served as a consultant in various engagements related to multimedia systems. In 1997, I served as a consultant for Prairiecomm Corp. where, among other tasks, I developed and deployed multimedia systems. Since 2002, I have also served as a member of the American National Standards Institute (ANSI) / Underwriters Laboratory (UL) Standards Technical Panel (STP) on various standards related to multimedia systems.

17. Additional details of my education and work experience, professional activities, awards and honors, and publications that may be relevant to opinions I have formed are set forth in my *curriculum vitae*, which is attached as **Exhibit A** to this Declaration.

II. MATERIALS CONSIDERED

18. In connection with my work on this Declaration, I have reviewed the Asserted Patents and their prosecution history files.

III. SUMMARY OF MY OPINIONS

- 19. I have been asked to opine on whether the following claim terms and phrases are indefinite:
 - a. "spatiotemporal continuity" / "spatiotemporally continuous" ('379: claim 21; '226: claims 1, 7; '298: claims 1, 13)
 - b. "substantially fills" ('379: claim 21; '298: claims 1, 13)
 - c. "after at most a small amount of time" ('226: claims 1, 7)
 - d. "providing a highlighted expansion cue to a user that is integrated with the display . . . whereby the display of the expansion cue is distinct from the display of the at least one segment" ('226: claim 7).
- 20. After reviewing the Asserted Patents and their corresponding prosecution history files, I have concluded that the claims having these terms and phrases are indefinite.

IV. RELEVANT LEGAL STANDARDS

- 21. I have been informed by counsel of and understand the following legal principles:
- 22. Claim construction is a matter of law in that the Court will ultimately determine the meanings of the claims of the Asserted Patents. In providing my opinions here, my purpose is to assist the Court in its construction of the disputed claims based upon how a person of

ordinary skill in the art ("POSITA") at the time of invention would have understood those claim terms.

A. The Claims of a Patent

- 23. I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to all of the limitations recited in the claim from which it depends.
- 24. I understand that a process or method claim covers an act or a series of acts or steps. I also understand that an apparatus or system claim covers a concrete thing, consisting of parts, or of certain devices and combination of devices.

B. Indefiniteness

- 25. I understand that a patent must conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention. I am informed that this is known as the "definiteness" requirement.
- 26. I understand that if a claim does not meet the definiteness requirement, it is considered "indefinite" and consequently invalid. A claim is indefinite if, read in light of the intrinsic record, the claim fails to inform those skilled in the art about the scope of the invention with reasonable certainty.

V. THE LEVEL OF ORDINARY SKILL IN THE ART

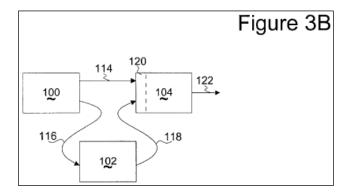
27. I understand that claim terms should be interpreted from the perspective of a person of ordinary skill in the art ("POSITA") of the applicable field as of the time the invention was made.

- 28. In my opinion, a POSITA in April 1999, the earliest possible priority date of the Asserted Patents, would have had (1) a Bachelor of Science degree or higher in electrical engineering, computer engineering, computer science, or a similar field; and (2) at least two years of experience working with video and multimedia technology. Additional education could have substituted for professional experience, and significant work experience could have substituted for formal education.
- 29. I met and exceeded the level of skill of a POSITA described above as of the priority date of April 1999.

VI. OVERVIEW OF THE ASSERTED PATENTS

- 30. The Asserted Patents share a common specification and each claims priority to the '158 patent, which was filed on April 23, 1999. For ease of reference, I will cite to the specification from the '158 patent throughout this Declaration unless otherwise noted.
- 31. The Asserted Patents, in general, relate to video and multimedia technology that enables a viewer to pause the playback of a main program content, select and view optional program content, and resume playback of the main program content. The specification explains that the media stream comprises a main program content segment 100, an optional expansion segment 102, and a continuing segment 104. '158 patent at 12:23-27. Each segment has a first terminus indicating the start of the segment (*e.g.*, reference numeral 120 of continuing segment 104), and a second terminus denoting the temporal end of the segment. *Id.* at 10:1-8; *see also* 12:39-42.
- 32. Figure 3B below illustrates the temporal flow between content segment 100, optional expansion segment 102, and continuing segment 104. *Id.* at 12:16-18, 12:34-35. As shown in Figure 3B, if the user selects the expansion segment, the temporal flow follows link 116 from content segment 100 to expansion segment 102, and then follows link 118 from

expansion segment 102 to continuing segment 104. If the user does not select the expansion segment, the temporal flow follows link 114 from content segment 100 to continuing segment 104.



VII. INDEFINITENESS ANALYSIS

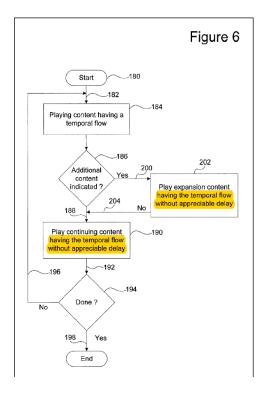
- A. "spatiotemporal continuity" and "spatiotemporally continuous"
- 33. Claim 21 of the '379 patent, claims 1 and 7 of the '226 patent, and claims 1 and 13 of the '298 patent include one of the terms "spatiotemporal continuity" or "spatiotemporally continuous." In my opinion, these terms are indefinite because a POSITA cannot reasonably ascertain the meaning of "spatiotemporal continuity" or "spatiotemporally continuous" as used in the claims and specifications.
- 34. Claim 21 of the '379 patent includes the language: "a visual portion of said second subset substantially fills the first visual display space during play of the second subset in *spatiotemporal continuity* with the first subset." '379 patent at 30:67-31:3 (claim 21.d.i) (emphasis added).
- 35. Claim 1 of the '226 patent includes the language: "the displayed second stored audio and/or visual content is *spatiotemporally continuous* with the displayed first stored audio and/or visual content and with a displayed third stored audio and/or visual content of the

continuing portion . . . wherein the displayed third stored audio and/or visual content is *spatiotemporally continuous* with the displayed first stored audio and/or visual content." *See* '226 patent at 27:54-58, 28:9-12 (claim 1.g, 1.i) (emphasis added). Claim 7 of the '226 patent includes the language: "the displayed second stored content forms a *spatiotemporal continuity* with the displayed first stored content . . . wherein the displayed third stored content forms a *spatiotemporal continuity* with the displayed second stored content." *Id.* at 29:12-14, 29:20-30:1 (claim 7.j, 7.k) (emphasis added).

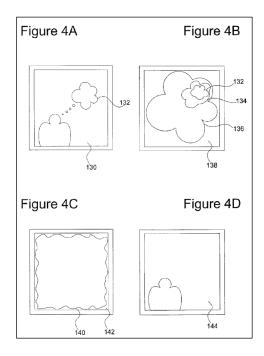
- 298 patent includes the language: "a visual portion of the expansion content substantially fills the first visual display space in *spatiotemporal continuity* with the visual portion of the main content continuous play media stream . . . wherein a visual portion of the temporarily stored portion of the main content continuous play media stream fills the first visual display space in *spatiotemporal continuity* with the visual portion of the expansion content." *See* '298 patent at 28:21-26, 28:43-47 (claim 1.v, 1.x) (emphasis added). Claim 13 of the '298 patent includes the language: "a visual portion of the promotional expansion content substantially fills the first visual display space in *spatiotemporal continuity* with the visual portion of the main content continuous play media stream . . . wherein a visual portion of the temporarily stored portion of the main content continuous play media stream fills the first visual display space in *spatiotemporal continuity* with the visual portion of the promotional expansion content." *Id.* at 30:10-14, 30:31-35 (claim 13.v, 13.x) (emphasis added).
- 37. In my opinion, these terms are subjective terms and are thus indefinite. Notably, the specification does not explicitly mention these terms. Furthermore, a POSITA would understand that these terms comprise at least two components: (1) a temporal continuity component and (2) spatial continuity component. In my opinion, the relevant portions of the

specification do not provide objective boundaries for either component. Rather, the specification describes both the temporal continuity component and spatial continuity component in a subjective manner.

38. Figure 6 and the corresponding portion of the specification provide description relevant to the temporal continuity component. Figure 6 describes that when the expansion content is selected, the expansion content is played having "the temporal flow without appreciable delay" (202). Figure 6 further describes that when the expansion content is not selected, or after the play of the expansion content, the continuing content is played having "the temporal flow without appreciable delay" (190). *See also* '158 patent at 15:49-60. Notably, the specification's only provided standard for the temporal continuity component is "without an appreciable delay." In my opinion, this standard is entirely subjective because it depends on the visual capabilities of the viewer. That is, one person may be able to observe a delay of a certain length, *e.g.*, 100 milliseconds, and another person may not.



39. Figures 4A-4D and the corresponding portion of the specification provide one example of the presentation of expansion content which is relevant to the concept of spatial continuity. In my opinion, the specification's description of Figures 4A-4D does not provide any objective guidance for the concept of spatial continuity. For example, the visual cue 132, upon selection by the viewer, "is successively expanded as shown in sequence 132, 134 and 136 so that the background 138 is rendered essentially trivial, if not actually non-existent from the user's perspective." *Id.* at 13:7-16.



This explanation of spatial continuity, similar to that of temporal continuity, is subjective because whether the expansion is "successive" and whether the background is rendered "essentially trivial" is dependent on the individual's perceptive. Further, even if a POSITA takes Figs. 4A-4D as one example of spatial continuity, the POSITA still would not know how to design visual presentations that meet the spatial continuity requirement here.

40. Lastly, in my opinion, the term "continuous" is used subjectively throughout the specification. This indicates that the terms "spatiotemporal continuity" or "spatiotemporally

continuous" lack objective boundaries. For example, the specification defines the term "continuous play media" as "minimally containing a stream of image or text content forming a perceived continuity when presented to an observer/user." *Id.* at 1:10-13. The term "perceived continuity" is a subjective phrase because whether the observer/user perceives the stream of image or text content as continuous is by definition a subjective matter to a particular observer/user. Further, the specification also explains that a "stream of image" may be presented in a display view "in a manner rendered essentially continuous." *Id.* at 1:23-25. But the meaning of the phrase "essentially continuous" here is also unclear.

41. For these reasons, in my opinion, the terms "spatiotemporal continuity" and "spatiotemporally continuous" are indefinite.

B. "substantially fills"

- 42. Claim 21 of the '379 patent and claims 1 and 13 of the '298 patent each include the term "substantially fills." In my opinion, this term is indefinite because a POSITA cannot reasonably ascertain the meaning of "substantially fills" as used in the claims and specifications.
- 43. Claim 21 of the '379 patent includes the language: "a visual portion of said first subset *substantially fills* a first visual display space during play of said first subset . . . wherein a visual portion of said second subset *substantially fills* the first visual display space during play of the second subset." *See* '379 patent at 30:46-49 (claim 21.b), 31:14-16 (claim 21.iv) (emphasis added).
- 44. Claim 1 of the '298 patent includes the language: "a visual portion of the main content continuous play media stream *substantially fills* a first visual display space during play . . . wherein a visual portion of the expansion content *substantially fills* the first visual display space." *See* '298 patent at 27:62-64 (claim 1.b), 28:22-25 (claim 1.v) (emphasis added). Claim

13 of the '298 patent includes the language: "a visual portion of the main content continuous play media stream *substantially fills* a first visual display space . . . wherein a visual portion of the promotional expansion content *substantially fills* the first visual display space." *Id.* at 29:25-27 (claim 13.b), 30:10-13 (claim 13.v) (emphasis added).

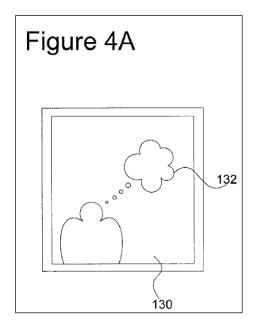
- 45. In my opinion, the phrase "substantially fills" is indefinite because it is a term of degree that describes the extent to which the visual portion fills the visual display space. The specification does not mention the phrase "substantially fills." The specification uses the terms "substantial" and "substantially," but only in the context of distance (*see* '158 patent at 5:10-11, 24:58:59), time (*id.* at 17:39-40), or choice of content (*id.* at 17:46-47). In my opinion, the use of "substantial" and "substantially" in the specification does not provide context for, or objectively define when, a visual portion "substantially fills" the display space.
- 46. In my opinion, the only portion of the specification relevant to the discussion of "substantially fills" is in Figures 4A-4D and the corresponding portions of the specification. In Figure 4B, the background 138 is "rendered essentially trivial" as the visual cue 132 "is successively expanded." *Id.* at 13:9-11. However, in my opinion and as discussed above for the term "spatiotemporal continuity," whether the background is "rendered essentially trivial" is a subjective determination. Similarly, in Figure 4C, the "expansion content" is presented in "the region 140 of display, with a minimal or non-existent background 142." *Id.* at 13:17-26, Fig. 4C. In my opinion, the phrase "minimal background" is also a subjective term because two individuals could disagree on whether the display region has a "minimal background." That is, the term "minimal background" is dependent on the perception of the viewer, and the specification does not provide any objective criteria for determining the scope of "a minimal

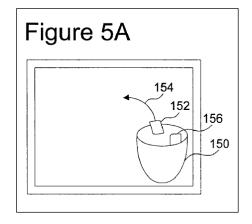
background," or when a "minimal background" constitutes a "substantially fill[ed]" display region.

- 47. Thus, in my opinion, the term "substantially fills" is indefinite.
- C. "after at most a small amount of time"
- 48. In my opinion, the phrase "after at most a small amount of time" is indefinite because a POSITA cannot reasonably ascertain the scope of "after at most a small amount of time" as used in the claims and specifications.
 - 49. Claims 1 and 7 of the '226 patent include the language:
 - "the display of the second stored [audio and/or visual] content replaces the display of the first stored [audio and/or visual] content *after at most a small amount of time*" (see '226 patent at 27:58-61 (claim 1.g), 29:14-16, (claim 7.j) (emphasis added));
 - "the display of the third stored [audio and/or visual] content replaces the display of the second stored [audio and/or visual] content *after at most a small amount of time*" (*id.* at 27:61-64 (claim 1.g), 30:1-3 (claim 7.k) (emphasis added)).
 - "the display of the third stored audio and/or visual content replaces the display of the first stored audio and/or visual content *after at most a small amount of time*" (*id.* at 28:12-15, claim 1.v (emphasis added)).
- 50. In my opinion, the phrase "after at most a small amount of time" is also a term of degree. While the specification mentions this term once (*see* '158 patent at 12:25-28) in connection with Figure 3A, the specification does not provide any objective standard, such as a time unit, for what amount of time is within the limit of "a small amount of time." The accompanying Figure 3A does not have a time scale or any other indicia of an objective standard

of the allowed time limit. The specification also uses the phrase "without appreciable delay." However, this phrase does not provide an objective standard for the term "after at most a small amount of time" because whether a delay of a certain length of time is "appreciable" is dependent on an individual's perception of the delay, and is thus subjective.

- 51. Thus, in my opinion, the phrase "after at most a small amount of time" is indefinite.
 - D. "providing a highlighted expansion cue to a user that is **integrated with**the display of the at least one segment . . . whereby the display of the
 expansion cue is distinct from the display of the at least one segment"
- 52. In my opinion, this term is indefinite as used in the claims and specifications. Claim 7 of the '226 patent includes the language: "providing a highlighted expansion cue to a user that is *integrated with the display of the at least one segment* indicating an option for the user to elect to access optional expansion content comprising an optional content continuous play media stream, whereby the display of the expansion cue is distinct from the display of the at least one segment." *See* '226 patent at 28:51-57 (claim 7.c) (emphasis added).
- 53. In my opinion, this term is indefinite because the specification does not explain what it means for the highlighted expansion cue to be "integrated with the display of the at least one segment." The specification merely discusses the term "integrated" in the context of hardware, and does not discuss the term "integrated" in the context of displaying highlighted expansion cues. *See* '158 patent at 5:60-61 ("Application Specific Integrated Circuits").
- 54. Figures 4A, 5A, and their corresponding portions of the specification discuss expansion cues 132 and 152, respectively. In my opinion, a POSITA cannot determine whether expansion cues 132 and 152 are "integrated with the display" by examining Figures 4A and 5A.





The corresponding portions of the specification do not explain whether these expansion cues are "integrated with the display" because the specification does not provide any relevant explanation. *See* '158 patent at 12:63-64 ("Visual cue 132 is seen against the basic continuous play sequence 130."); 13:9-12 ("Visual cue 132 is successively expanded as shown in sequence 132, 134 and 136 so that the background 138 is rendered essentially trivial, if not actually non-existent from the user's perspective."); 13:45-49 ("FIG. 5A shows the user view of multiple expansion cues 152 and 156 further contained in an expansion cue container 150 . . ."). The specification does not provide any guidance to a POSITA as to what other types of visual cues are "integrated with" the display.

55. Further, the claim language requires that the expansion cue "is integrated with the display of the at least one segment," yet also requires that "the display of the expansion cue is distinct from the display of the at least one segment." *See* 226 patent at 28:51-52, 55-56. However, nothing in the specification clarifies to a POSITA how the visual cue is integrated with

the display of segment and simultaneously the display of the expansion cue is distinct from the display of the same segment.

56. Thus, for the above reasons, in my opinion, this claim term is indefinite.

I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge, information, and belief, formed after reasonable inquiry under the circumstances.

Executed on the 7th day of October, 2020, in Waco, Texas.

Dan Schonfeld, Ph.D.